

8. REGULATIONS AND ADVISORIES

Because of its potential to cause adverse health effects in exposed people, a number of regulations and advisory values have been established for carbon tetrachloride by various international, national, and state agencies. These values are summarized in Table 8-1.

EPA has calculated a chronic oral reference dose (RfD) of 7×10^{-4} mg/kg/day for carbon tetrachloride based on a NOAEL of 1 mg/kg/day (converted to 0.71 mg/kg/day based on intermittent exposure) for rats in a 12-week study (Bruckner et al. 1986; IRIS 2003). The critical effect was liver toxicity. A subchronic oral RfD of 7×10^{-3} mg/kg/day was also calculated based on the same NOAEL used for the chronic RfD (EPA 1989b). ATSDR has calculated an intermediate inhalation MRL of 0.03 ppm based on a NOAEL of 5 ppm and a LOAEL of 10 ppm (1 ppm and 2 ppm, respectively, adjusted for intermittent exposure) for liver effects in an intermediate-duration (187–192 days) inhalation study in rats exposed 7 hours/day (Adams et al. 1952). The intermediate-duration MRL is expected to be protective also for acute-duration inhalation exposures. ATSDR has also calculated a chronic inhalation MRL of 0.03 ppm based on a NOAEL of 5 ppm (0.9 ppm, adjusted for intermittent exposure) and a LOAEL of 25 ppm (4.5 ppm, adjusted for intermittent exposure) for hepatic effects in rats exposed for 6 hours/day, 5 days/week for 2 years (Japan Bioassay Research Center 1998; Nagano et al. 1998). ATSDR has also calculated an acute oral MRL of 0.05 mg/kg/day based on a LOAEL of 5 mg/kg/day over 10 days for minimal liver effects in the rat (Smialowicz et al. 1991), and an intermediate oral MRL of 0.02 mg/kg/day based on a NOAEL of 1 mg/kg/day (0.71 mg/kg/day adjusted for intermittent exposure) for liver effects in rats dosed 5 days/week over 12 weeks (Bruckner et al. 1986). More information about the derivation of MRLs is found in Section 2.3 and Appendix A.

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Table 8-1. Regulations and Guidelines Applicable to Carbon Tetrachloride

Agency	Description	Information	Reference
<u>INTERNATIONAL</u> Guidelines:			
IARC	Carcinogenicity classification	Group 2B ^a	IARC 1999
WHO	Guideline value or tolerable concentration for air quality	6.1 µg/m ³	WHO 2000
	Guideline for drinking water	2 µg/L	WHO 1993
<u>NATIONAL</u> Regulations and Guidelines:			
a. Air			
ACGIH	TLV (8-hour TWA) ^b TLV-STEL (15-minute TWA)	5 ppm 10 ppm	ACGIH 2003
EPA	Hazardous air pollutant pursuant to Section 112 of the Clean Air Act		EPA 2003e 40 CFR 61.01(b)
	Protection of stratospheric ozone; listed as a ozone-depleting chemical	Group IV	EPA 2003h 40 CFR 82, Subpart A, Appendix F
NIOSH	STEL (60-minute TWA) IDLH Potential occupational carcinogen	2 ppm 200 ppm	NIOSH 2003
OSHA	PEL (8-hour TWA) for general industry	2 mg/m ³	OSHA 2003c 29 CFR 1910.1000, Table Z-1
	PEL (8-hour TWA) Acceptable ceiling concentration Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift	10 ppm 25 ppm 200 ppm (maximum duration for 5 minutes in any 4 hours)	OSHA 2003e 29 CFR 1910.1000, Table Z-2
	PEL (8-hour TWA) for construction industry ^c	10 ppm	OSHA 2003f 29 CFR 1926.55, Appendix A
	PEL (8-hour TWA) for shipyard industry ^c	10 ppm	OSHA 2003a 29 CFR 1915.1000
USC	Hazardous air pollutant		USC 2003 42 USC 7412
b. Water			
EPA	Drinking water health advisories 1-day (10-kg child) 10-day (10-kg child) DWEL ^d 10 ⁻⁴ Cancer risk ^e	4 mg/L 0.2 mg/L 0.03 mg/L 0.03 mg/L	EPA 2002

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Agency	Description	Information	Reference
<u>NATIONAL</u> (cont.)			
EPA	Effluent guidelines and standards; toxic pollutants pursuant to Section 307(a)(1) of the Clean Water Act		EPA 2003c 40 CFR 401.15
	Hazardous substance in accordance with Section 311 of the Clean Water Act		EPA 2003n 40 CFR 116.4
	National primary drinking water regulations—MCL	5 µg/L	EPA 2003g 40 CFR 141.61
	National primary drinking water regulations—MCLG	0 µg/L	EPA 2003f 40 CFR 141.50
	Pollutant of initial focus in the Great Lakes Water Quality Initiative		EPA 2003o 40 CFR 132, Table 6
	Reportable quantity of hazardous substances designated pursuant to Section 311 of the Clean Water Act	10 pounds	EPA 2003i 40 CFR 117.3
c. Food			
FDA	Bottled drinking water allowable level	5 µg/L	FDA 2003a 21 CFR 165.110
	Indirect food additive; adhesives		FDA 2003b 21 CFR 175.105
	Indirect food additive; paper and paperboard components; anti-offset substances		FDA 2003c 21 CFR 176.130(c)
	Indirect food additive; components of paper and paperboard in contact with dry food		FDA 2003d 21 CFR 176.180
	Labeling; warning statements for prescription and restricted device products containing or manufactured with chlorofluorocarbons or other ozone-depleting substances		FDA 2003f 21 CFR 801.433
	Labeling; medical devices; warning statements for devices containing or manufactured with chlorofluorocarbons and other class I ozone-depleting substances		FDA 2003e 21 CFR 801.63
d. Other			
ACGIH	Carcinogenicity classification	A2 ^f	ACGIH 2003
EPA	Carcinogenicity classification	B2 ^g	IRIS 2003
	RfD (chronic oral)	7x10 ⁻⁴ mg/kg/day	IRIS 2003

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Agency	Description	Information		Reference
<u>NATIONAL</u> (cont.)				
EPA	Community right-to-know; release reporting; effective date of reporting	01/01/87		EPA 2003m 40 CFR 372.65
	Criteria for municipal solid waste landfills; hazardous constituent			EPA 2003a 40 CFR 258, Appendix II
	Identification and listing of hazardous waste; regulatory level of the maximum concentration of contaminants for the toxicity characteristic	0.5 mg/L		EPA 2003d 40 CFR 261.24
	Reportable quantity; designated as a hazardous substances pursuant to Section 307 and 311 of the Clean Water Act, Section 112 of the Clean Air Act, and Section 3001 of RCRA	10 pounds		EPA 2003b 40 CFR 302.4
	Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities; groundwater monitoring	Suggested <u>Method</u> 8010 8240	<u>PQL</u> 1 µg/L 5 µg/L	EPA 2003l 40 CFR 264, Appendix IX
	Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities; health-based limits for exclusion of waste-derived residues; residue concentration limit	5x10 ⁻³ mg/kg		EPA 2003k 40 CFR 266, Appendix VII
	Standards for the management of specific hazardous waste and hazardous waste management facilities; risk specific dose	6.7x10 ⁻¹ µg/m ³		EPA 2003j 40 CFR 266, Appendix V
NTP	Reasonably anticipated to be a human carcinogen			NTP 2002
<u>STATE</u>				
a. Air	No data			
b. Water				
Arizona	Drinking water guideline	0.27 µg/L		
California	Drinking water standard	0.5 µg/L		HSDB 2003
Connecticut	Drinking water guideline	5 µg/L		HSDB 2003
Florida	Drinking water standard	3 µg/L		HSDB 2003
Maine	Drinking water guideline	2.7 µg/L		HSDB 2003
Minnesota	Drinking water guideline	3 µg/L		HSDB 2003
New Jersey	Drinking water standard	2 µg/L		HSDB 2003
c. Food	No data			

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<u>STATE (cont.)</u>			
d. Other	No data		

^aGroup 2B: possibly carcinogenic to humans

^bSkin notation: refers to the potential significant contribution to the overall exposure by the cutaneous route, including mucous membranes and the eyes, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance.

^cSkin designation

^dDWEL: a lifetime exposure concentration protection of adverse, non-cancer health effects, that assumes all of the exposure to a contaminant is from drinking water.

^e10⁻² Cancer risk: the concentration of a chemical in drinking water corresponding to an excess estimated lifetime cancer risk of 1 in 10,000

^fA2: suspected human carcinogen

^gB2: probable human carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; CFR = Code of Federal Regulations; DWEL = drinking water equivalent level; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; HSDB = Hazardous Substances Data Bank; IARC = International Agency for Research on Cancer; IDLH = immediately dangerous to life or health; IRIS = Integrated Risk Information System; MCL = maximum contaminant level; MCLG = maximum contaminant level goal; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; PQL = practical quantitation limit; OSHA = Occupational Safety and Health Administration; PEL = permissible exposure limit; RCRA = Resource Conservation and Recovery Act; RfD = reference dose; STEL = short-term exposure limit; TLV = threshold limit values; TWA = time-weighted average; USC = United States Codes; WHO = World Health Organization